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FURTHER

OBSERVATIONS

ON THE

VARIOLÆ VACCINÆ.

Price 2s. 6d.

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OR

COW POX.

By EDWARD JENNER, M.D. F.R.S. F.L.S. &c.

London:

PRINTED, FOR THE AUTHOR,

BY SAMPSON LOW, N°. 7, BERWICK STREET, SOHO:

AND SOLD BY LAW, AVE-MARIA LANE, AND MURRAY AND HIGHLEY, FLEET STREET.

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INQUIRY

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TO

C. H. PARRY, M. D.

AT BATH.

MY DEAR FRIEND,

THE ſame motives which impelled me to dedicate to you my firſt Eſſay on the Variolæ Vaccinæ, induce me to offer you my further Obſervations on the ſame ſubject.

I am pleaſed at ſeeing the inveſtigation ſo generally entered into, and I hope that the ſpirit with which this important inquiry will be proſecuted, may be tempered with that calmneſs and moderation which ſhould ever accompany philoſophical reſearches.

With the greateſt regard

I remain

Your's, very ſincerely,

EDWARD JENNER.

Berkeley, Glouceſterſhire,
5th April, 1799.

FURTHER

OBSERVATIONS,

&c. &c.

ALTHOUGH it has not been in my power to extend the Inquiry into the cauſes and effects of the Variolæ Vaccinæ much beyond its original limits, yet, perceiving that it is beginning to excite a general ſpirit of inveſtigation, I think it of importance, without delay, to communicate ſuch facts as have ſince occurred, and to point out the fallacious ſources from whence a diſeaſe imitative of the true Variolæ Vaccinæ might ariſe, with the view of preventing thoſe who may inoculate, from producing a ſpurious diſeaſe; and further, to enforce the precaution ſuggeſted in the former Treatiſe on the ſubject, of ſubduing the inoculated

puſtule as ſoon as it has ſufficiently produced its influence on the conſtitution. From a want of due diſcrimination of the real exiſtence of the diſeaſe either in the brute or in the human ſubject, and alſo of that ſtage of it in which it is capable of producing the change in the animal economy which renders it unſuſceptible of the contagion of the Small Pox, unpleaſant conſequences might enſue, the ſource of which, perhaps, might not be ſuſpected by one inexperienced in conducting ſuch experiments.

My late publication contains a relation of moſt of the facts which had come under my own inſpection at the time it was written, interſperſed with ſome conjectural obſervations. Since then Dr. G. Pearſon has eſtabliſhed an inquiry into the validity of my principal aſſertion, the reſult of which cannot but be highly flattering to my feelings. It contains not a ſingle caſe which I think can be called an exception to the fact I was ſo firmly impreſſed with — that the Cow Pox protects the human body from the Small Pox. I have myſelf received ſome further confirmations, which ſhall be ſubjoined. I have lately alſo been favoured with a letter from a gentleman of great reſpectability (Dr. Ingenhouſz), informing me that, on making an inquiry into the ſubject in the county of Wilts, he diſcovered that a

farmer

farmer near Calne had been infected with the Small Pox after having had the Cow Pox, and that the diſeaſe in each inſtance was ſo ſtrongly characteriſed as to render the facts incontrovertible. The Cow Pox, it ſeems, from the Doctor's information, was communicated to the farmer from his cows at the time that they gave out *an offenſive ſtench from their udders.*

Some other inſtances have likewiſe been repreſented to me of the appearance of the diſeaſe, apparently marked with its characteriſtic ſymptoms, and yet that the patients have afterwards had the Small Pox. On theſe Caſes I ſhall, for the preſent, ſuſpend any particular remarks, but hope that the general obſervations I have to offer in the ſequel will prove of ſufficient weight to render the idea of their ever having had exiſtence, but as caſes of ſpurious Cow Pox, extremely doubtful.

Ere I proceed let me be permitted to obſerve, that Truth, in this and every other phyſiological Inquiry that has occupied my attention, has ever been the object of my purſuit; and ſhould it appear in the preſent inſtance that I have been led into error, fond as I may appear of the offspring of my labours, I had rather ſee it periſh at once, than exiſt and do a public injury.

I ſhall proceed to enumerate the ſources, or what appear to me as ſuch, of a ſpurious Cow Pox.

1ſt. That ariſing from puſtules on the nipples or udder of the cow; which puſtules contain no ſpecific virus.

2dly. From matter (although originally poſſeſſing the ſpecific virus) which has ſuffered a decompoſition, either from putrefaction or from any other cauſe leſs obvious to the ſenſes.

3dly. From matter taken from an ulcer in an advanced ſtage, which ulcer aroſe from a true Cow Pock.

4thly. From matter produced on the human ſkin from contact with ſome peculiar morbid matter generated by a horſe.

On theſe ſubjects I ſhall offer ſome comments. Firſt — To what length puſtulous diſeaſes of the udder and nipples of the cow may extend, it is not in my power to determine; but certain it is, that theſe parts of the animal are ſubject to ſome variety of maladies of this nature; and as many of theſe eruptions (probably all of them) are capable of giving a diſeaſe to the human

human body, would it not be diſcreet for thoſe engaged in this inveſtigation to ſuſpend controverſy and cavil until they can aſcertain with preciſion what *is* and what *is not* the Cow Pox?

For example.—A farmer who is not converſant with any of theſe maladies, but who may have heard of the Cow Pox in general terms, may acquaint a neighbouring ſurgeon that the diſtemper appears at his farm. The ſurgeon, eager to make an experiment, takes away matter, inoculates, produces a ſore, uneaſineſs in the axilla, and perhaps ſome affection of the ſyſtem. This is one way in which a fallacious idea of ſecurity both in the mind of the inoculator and the patient may ariſe; for a diſeaſe may thus have been propagated from a ſimple eruption only.

One of the firſt objects then of this purſuit, as I have obſerved, ſhould be, to learn how to diſtinguiſh with accuracy between that peculiar puſtule which is the *true* Cow Pock, and that which is ſpurious. Until experience has determined this, we view our object through a miſt. Let us for inſtance ſuppoſe, that the Small Pox and the Chicken Pox were at the ſame time to ſpread among the inhabitants of a country which had never

been

been viſited by either of theſe diſtempers, and where they were quite unknown before; what confuſion would ariſe! The reſemblance between the ſymptoms of the eruptive fever and between the puſtules in either caſe would be ſo ſtriking, that a patient, who had gone through the Chicken Pox to any extent, would feel equally eaſy with regard to his future ſecurity from the Small Pox as the perſon who had actually paſſed through that diſeaſe. Time and future obſervation would draw the line of diſtinction.

So I preſume it will be with the Cow Pox until it is more generally underſtood. All cavilling therefore on the mere report of thoſe who *tell us* they have had this diſtemper, and are afterwards found to be ſuſceptible of the Small Pox, ſhould be ſuſpended. To illuſtrate this, I beg leave to give the following hiſtory:

SARAH MERLIN, of the pariſh of Eaſtington in this county, when about thirteen or fourteen years of age lived as a ſervant with farmer Clarke, who kept a dairy conſiſting of about eighteen cows at Stonehouſe, a neighbouring village. The nipples and udders of three of the cows were extenſively affected with

with large white bliſters. Theſe cows the girl milked daily, and at the ſame time ſhe aſſiſted, with two others, in milking the reſt of the herd. It ſoon appeared that the diſeaſe was communicated to the girl. The reſt of the cows eſcaped the infection, although they were milked ſeveral days after the three above ſpecified had theſe eruptions on the nipples and udders, and even after the girl's hand became ſore. The two others who were engaged in milking, although they milked the cows indiſcriminately, received no injury. On the fingers of each of the girl's hands there appeared ſeveral large white bliſters, ſhe ſuppoſes about three or four on each finger. The hands and arms inflamed and ſwelled, but no conſtitutional indiſpoſition followed. The ſores were anointed with ſome domeſtic ointment, and got well without ulcerating.

As this malady was called the Cow Pox, and recorded as ſuch in the mind of the patient, ſhe became regardleſs of the Small Pox; but, on being expoſed to it ſome years afterwards, ſhe was infected, and had a full burthen.

Now had any one converſant with the habits of the diſeaſe heard this hiſtory, they would have had no heſitation in pronouncing

nouncing it a caſe of ſpurious Cow Pox; conſidering its deviation in the *numerous* bliſters which appeared on the girl's hands; their termination without ulceration; its not proving more generally contagious at the farm either among the cattle or thoſe employed in milking; and conſidering alſo that *the patient felt no general indiſpoſition, although there was ſo great a number of veſicles.*

This is perhaps the moſt deceptious form in which an eruptive diſeaſe can be communicated from the cow, and it certainly requires ſome attention in diſcriminating it. The moſt perfect criterion by which the judgement may be guided, is perhaps that adopted by thoſe who attend infected cattle. Theſe white bliſters on the nipples, they ſay, *never eat into the fleſhy parts* like thoſe which are commonly of a blueiſh caſt, and which conſtitute the *true Cow Pox,* but that they affect the ſkin only, quickly end in ſcabs, and are not nearly ſo infectious.

That which appeared to me as one cauſe of ſpurious eruptions, I have already remarked in the former Treatiſe, namely, the tranſition that the cow makes in the ſpring from a poor to a nutritious diet, and from the udder's becoming at this time more

vaſcular

vaſcular than uſual for the ſupply of milk. But there is another ſource of inflammation and puſtules which I believe is not uncommon in all the dairy counties in the weſt of England. A cow intended to be expoſed for ſale, having naturally a ſmall udder, is previouſly for a day or two neither milked artificially, nor is her calf ſuffered to have acceſs to her. Thus the milk is preternaturally accumulated, and the udder and nipples become greatly diſtended. The conſequences frequently are, inflammation and eruptions which maturate.

Whether a diſeaſe generated in this way has the power of affecting the conſtitution in any *peculiar* manner, I cannot preſume poſitively to determine. It has been conjectured to have been a cauſe of the true Cow Pox, though my inquiries have not led me to adopt this ſuppoſition in any one inſtance; on the contrary, I have known the milkers affected by it, but always found that an affection thus induced left the ſyſtem as ſuſceptible of the Small Pox as before.

What is advanced in my ſecond poſition, I conſider alſo of very great importance, and I could wiſh it to be ſtrongly impreſſed on the minds of all who may be diſpoſed to conclude

haſtily on my obſervations, whether engaged in their inveſtigation by experiments or not.—To place this in its cleareſt point of view (as the ſimilarity between the action of the Small Pox and the Cow Pox matter is ſo obvious) it will be neceſſary to conſider what we ſometimes obſerve to take place in inoculation for the Small Pox when imperfect variolous matter is made uſe of. The conciſe hiſtory on this ſubject that was brought forward reſpecting what I had obſerved in this neighbourhood*, I perceive by a reference ſince made to the Memoirs of the Medical Society of London, may be conſidered as no more than a corroboration of the facts very clearly detailed by Mr. Kite †. To this copious evidence I have to add ſtill more in the following communications from Mr. Earle, ſurgeon, of Frampton-upon-Severn, in this county, which I deem the more valuable, as he has with much candour permitted me to make them public.

* Inquiry into the Cauſes and Effects of the Variolæ Vaccinæ, page 56.

† See an account of ſome anomalous appearances conſequent to the inoculation of the Small Pox, by Charles Kite, Surgeon, of Graveſend, in the Memoirs of the Medical Society of London. Vol. iv. page 114.

"Sir,

" SIR,

" I have read with ſatisfaction your late publication on the Variolæ Vaccinæ, and being, among many other curious circumſtances, particularly ſtruck with that relating to the inefficacy of Small Pox matter in a particular ſtate, I think it proper to lay before you the following facts which came within my own knowledge, and which certainly tend to ſtrengthen the opinions advanced in pages 56 and 57 of your Treatiſe.

" In March 1784, a general inoculation took place at Arlingham in this county. I inoculated ſeveral patients with active variolous matter, all of whom had the diſeaſe in a favourable way; but my matter being all uſed, and not being able to procure any more in the ſtate I wiſhed, I was under the neceſſity of taking it from a puſtule which, experience has ſince proved, was advanced too far to anſwer the purpoſe I intended. Of five perſons inoculated with this laſt matter, four took the Small Pox afterwards in the natural way; one of whom died, three recovered, and the other, being cautioned by me to avoid as much as poſſible the chance of catching it, eſcaped from the diſeaſe through life. He died of another diſorder about two years ago.

" Although one of theſe caſes ended unfortunate, yet I cannot ſuppoſe that any medical man will think me careleſs or inattentive in their management; for I conceive the appearances were ſuch as might have induced any one to ſuppoſe that the perſons were perfectly ſafe from future infection. Inflammation in every caſe took place in the arm, and fever came on with a conſiderable degree of pain in the axilla. In ſome of their arms the inflammation and ſuppuration were more violent than is commonly obſerved when perfect matter is made uſe of; in one there was an ulcer which caſt off ſeveral large ſloughs. About the ninth day eruptions appeared, which died away earlier than common without maturation.—From theſe circumſtances I ſhould ſuppoſe that no medical practitioner would ſcarcely have entertained a doubt but that theſe patients had been infected with a true Small Pox; yet I muſt confeſs that ſome ſmall degree of doubt preſented itſelf to me at the ſpeedy diſappearance of the eruptions; and in order, as far as I could, to aſcertain their ſafety, I ſent one of them to a much older practitioner than myſelf. This gentleman, on hearing the circumſtances of the caſe, pronounced the patient perfectly ſecure from future infection.

" The

" The following facts are alſo a ſtriking proof of the truth of your obſervations on this ſubject:

" In the year 1789 I inoculated three children of Mr. Coaley, of Hurſt farm in this county. The arms inflamed properly, fever and pain in the axillæ came on preciſely the ſame as in the former caſes, and in ten days eruptions appeared, which diſappeared in the courſe of two days. I muſt obſerve that the matter here made uſe of was procured for me by a friend: but no doubt it was in an improper ſtate; for, from the ſimilarity of theſe caſes to thoſe which happened at Arlingham five years before, I was ſomewhat alarmed for their ſafety, and deſired to inoculate them again; which being permitted, I was particularly careful to procure matter in its moſt perfect ſtate. All the children took the Small Pox from this ſecond inoculation, and all had a very full burthen. Theſe facts I conceive ſtrikingly corroborate your opinion relative to the different ſtates of matter; for in both the inſtances that I have mentioned it was capable of producing ſomething ſtrongly reſembling the true Small Pox, although it afterwards proved not to be ſo.

" As

"As I think the communication of theſe Caſes is a duty I owe to the public, you are at liberty to make what uſe you pleaſe of this letter.

"I remain, &c.

Frampton-upon-Severn, Glouceſterſhire, November 10, 1798. "JOHN EARLE.

"P. S. I think it neceſſary to obſerve, that I can pronounce with the greateſt certainty, that the matter with which the Arlingham patients were inoculated was taken from a true Small Pox puſtule. I took it myſelf from a ſubject that had a very full burthen."

Certain then it is that variolous matter may undergo ſuch a change from the putrefactive proceſs, as well as from ſome of the more obſcure and latent proceſſes of nature, as will render it incapable of giving the Small Pox in ſuch a manner as to ſecure the human conſtitution from future infection, although we ſee at the ſame time it is capable of exciting a diſeaſe which bears ſo ſtrong a reſemblance to it, as to produce inflammation and matter in the inciſed ſkin (frequently indeed more violent than when it produces its effects perfectly), ſwelling of the axillary glands,

general

general indiſpoſition, and eruptions. So ſtrongly perſuaded was the gentleman, whoſe practice I have mentioned in page 56 of the late Treatiſe, that he could produce a mild Small Pox by his mode of managing the matter, that he ſpoke of it as a uſeful diſcovery, until convinced of his error by the fatal conſequence which enſued.

After this ought we to be in the ſmalleſt degree ſurpriſed to find, among a great number of individuals who by living in dairies have been caſually expoſed to the Cow Pox virus when in a ſtate analogous to that of the Small Pox above deſcribed, ſome, who may have had the diſeaſe ſo imperfectly as not to render them ſecure from variolous attacks? For the matter, when burſt from the puſtules on the nipples of the cow, by being expoſed, from its lodgment there, to the heat of an inflamed ſurface, and from being at the ſame time in a ſituation to be occaſionally moiſtened with milk, is often likely to be in a ſtate conducive to putrefaction; and thus, under ſome modification of decompoſition, it muſt of courſe ſometimes find acceſs to the hand of the milker in ſuch a way as to infect him. What confuſion ſhould we have, were there no other mode of inoculating the Small Pox than ſuch as would happen from handling

the diſeaſed ſkin of a perſon labouring under that diſtemper in ſome of its advanced and loathſome ſtages! It muſt be obſerved that every caſe of Cow Pox in the human ſpecies, whether communicated by deſign or otherwiſe, is to be conſidered as a caſe of inoculation. And here I may be allowed to make an obſervation on the caſe of the farmer communicated to me by Dr. Ingenhouſz. That he was expoſed to the matter when it had undergone the putrefactive change, is highly probable from the Doctor's obſerving that the ſick cows at the farm gave out an *offenſive ſtench from their udders.* However, I muſt remark, that it is unuſual for cattle to ſuffer to ſuch an extent, when diſordered with the Cow Pox, as to make a by-ſtander ſenſible of any ill ſmell. I have often ſtood among a herd which had the diſtemper without being conſcious of its preſence from any particular effluvia. Indeed, in this neighbourhood it commonly receives an early check from eſcharotic applications of the *cow leech.* It has been conceived to be contagious without contact; but this idea cannot be well founded, becauſe the cattle in one meadow do not infect thoſe in another (although there may be no other partition than a hedge) unleſs they be handled or milked by thoſe who bring the infectious matter with them; and of courſe the ſmalleſt particle imaginable, when applied to a part ſuſceptible of its influence, may produce

the

the effect. Among the human ſpecies it appears to be very clear, that the diſeaſe is produced by contact only. All my attempts, at leaſt, to communicate it by effluvia have hitherto proved ineffectual.

As well as the perfect change from that ſtate in which variolous matter is capable of producing full and deciſive effects on the conſtitution, to that wherein its ſpecific properties are entirely loſt, it may reaſonably be ſuppoſed that it is capable of undergoing a variety of intermediate changes. The following ſingular occurrences in ten caſes of inoculation, obligingly communicated to me by Mr. Trye, Senior Surgeon to the Infirmary at Gloceſter, ſeem to indicate that the variolous matter, previouſly to its being taken from the patient for the intended purpoſe, was beginning to part with ſome of its original properties, or, in other words, that it had ſuffered a partial decompoſition. Mr. Trye ſays, "I inoculated ten children with matter taken at one time and from the ſame ſubject. I obſerved no peculiarity in any of them previouſly to their inoculation, nor did any thing remarkable appear in their arms till after the decline of the diſeaſe. Two infants of three months old had eryſipelas about the inciſions, in one of them extending from

the ſhoulders to the fingers ends. Another infant had abſceſſes in the cellular ſubſtance in the neighbourhood of the inciſions, and five or ſix of the reſt had axillary abſceſſes. The matter was taken from the diſtinct Small Pox late in its progreſs, and when ſome puſtules had been dried. It was received upon glaſs, and ſlowly dried by the fire. All the children had puſtules which maturated, ſo that I ſuppoſe them all ſecure from future infection; at leaſt, as ſecure as any others whom I have ever inoculated. My practice never afforded a ſore arm before."

In regard to my former obſervation on the improper and dangerous mode of preſerving variolous matter, I ſhall here remark, that it ſeems not to have been clearly underſtood. Finding that it has been confounded with the more eligible modes of preſervation, I will explain myſelf further. When the matter is taken from a fit puſtule and properly prepared for preſervation, it may certainly be kept without loſing its ſpecific properties a great length of time; for inſtance, when it is previouſly dried in the open air on ſome compact body, as a quill or a piece of glaſs, and afterwards ſecured in a ſmall vial*. But

* Thus prepared, the Cow Pox virus was found perfectly active, and poſſeſſing all its ſpecific properties, at the end of three months.

when

when kept ſeveral days in a ſtate of moiſture, and during that time expoſed to a warm temperature, I do not think it can be relied upon as capable of giving a *perfect* diſeaſe, although, as I have before obſerved, the progreſs of the ſymptoms ariſing from the action of the imperfect matter bear ſo ſtrong a reſemblance to the Small Pox when excited completely.

3dly. That the firſt formed virus, or what conſtitutes the true Cow Pock puſtule, invariably poſſeſſes the power I have aſcribed to it, namely, that of affecting the conſtitution with a ſpecific diſeaſe, is a truth that no ſubſequent occurrence has yet led me to doubt. But as I am now endeavouring to guard the public as much as poſſible againſt erroneous concluſions, I ſhall obſerve, that when this puſtule has degenerated into an ulcer (to which ſtate it is often diſpoſed to paſs unleſs timely checked) I ſuſpect that matter poſſeſſing very different properties may ſooner or later be produced; and although it may have paſſed that ſtage wherein the ſpecific properties of the matter ſecreted are no longer preſent in it, yet when applied to a ſore (as in the caſual way) it might diſpoſe that ſore to ulcerate, and from its irritation the ſyſtem would probably become

 affected;

affected; and thus, by aſſuming ſome of its ſtrongeſt characters, it would imitate the genuine Cow Pox.

From the preceding obſervations on the matter of Small Pox when decompoſed, it muſt, I conceive, be admitted, that Cow Pox matter in the ſtate now deſcribed may produce a diſeaſe, the effects of which may be felt both locally and generally, yet that the diſeaſe thus induced may not be effectual in obviating the future effects of variolous contagion. In the caſe of Mary Miller, related by Mr. Kite in the volume above alluded to, it appears that the inflammation and ſuppuration of the inoculated arm were more than uſually ſevere, although the ſyſtem underwent no ſpecific change from the action of the virus; which appears from the patient's ſickening ſeven weeks afterwards with the natural Small Pox, which went through its courſe. Some of the Caſes communicated by Mr. Earle tend further to confirm this fact, as the matter there manifeſtly produced ulceration on the inoculated part to a conſiderable extent.

4thly. Whether the Cow Pox is a ſpontaneous diſeaſe in the cow, or is to be attributed to matter conveyed to the animal, as

I have

I have conceived, from the horſe, is a queſtion, which though I ſhall not attempt now fully to diſcuſs, yet I ſhall digreſs ſo far as to adduce ſome further obſervations, and to give my reaſons more at large for taking up an opinion that to ſome has appeared fanciful. The aggregate of theſe obſervations, though not amounting to poſitive proof, forms preſumptive evidence of ſo forcible a kind, that I imagine it might on any other perſon have made the ſame impreſſion it did on me, without fixing the imputation of credulity.

Firſt. I conceived this was its ſource, from obſerving that where the Cow Pox had appeared among the dairies here (unleſs it could be traced to the introduction of an infected cow or ſervant) it had been preceded at the farm by a horſe diſeaſed in the manner already deſcribed, which horſe had been attended by ſome of the milkers.

Secondly. From its being a popular opinion throughout this great dairy country, and from its being inſiſted on by thoſe who here attend ſick cattle.

Thirdly.

Thirdly. From the total abſence of the diſeaſe in Ireland and Scotland, where the men ſervants are not employed in the dairies *.

Fourthly. From having obſerved that morbid matter generated by the horſe frequently communicates, in a caſual way, a diſeaſe to the human ſubject ſo like the Cow Pox, that in many caſes it would be difficult to make the diſtinction between one and the other †.

Fifthly. From being induced to ſuppoſe from experiments, that ſome of thoſe who had been thus affected from the horſe reſiſted the Small Pox.

Sixthly. From the progreſs and general appearance of the puſtule on the arm of the boy whom I inoculated with matter taken from the hand of a man infected by a horſe; and from the

* This information was communicated to me from the firſt authority.

† The ſound ſkin does not appear to be ſuſceptible of this virus when inſerted into it, but, when previouſly diſeaſed from little accidents, its effects are often conſpicuous.

ſimilarity

ſimilarity to the Cow Pox of the general conſtitutional ſymptoms which followed *.

I fear it would be treſpaſſing too far to adduce the general teſtimony of our farmers in ſupport of this opinion; yet I beg leave to introduce an extract of a letter on this ſubject from the Rev. Mr. Moore, of Chalford Hill, in this county.

" In the month of November 1797, my horſe had diſeaſed heels, which was certainly what is termed the greaſe; and at a ſhort ſubſequent period my cow was alſo affected with what a neighbouring farmer (who was converſant with the complaints of cattle) pronounced to be the Cow Pox, which he at the ſame time obſerved my ſervant would be infected with: and this proved to be the caſe; for he had eruptions on his hands, face, and many parts of the body, the puſtules appearing large, and not much unlike the Small Pox, for which he had been inoculated

* This Caſe (on which I laid no inconſiderable ſtreſs in my late Treatiſe, as preſumptive evidence of the fact adduced) ſeems to have been either miſtaken or overlooked by thoſe who have commented upon it.—See Caſe xviii, page 36. The boy unfortunately died of a fever at a pariſh workhouſe before I had an opportunity of obſerving what effects would have been produced by the matter of Small Pox.

a year and a half before, and had then a very heavy burthen. The puſtules on the face might ariſe from contact with his hands, as he had a habit of rubbing his forehead, where the ſores were the largeſt and the thickeſt.

" The boy aſſociated with the farmer's ſons during the continuance of the diſeaſe, neither of whom had had the Small Pox, but they felt no ill effects whatever. He was not much indiſpoſed, as the diſeaſe did not prevent him from following his occupations as uſual. No other perſon attended the horſe or milked the cow, but the lad above mentioned. I am firmly of opinion that the diſeaſe in the heels of the horſe, which was a virulent greaſe, was the origin of the ſervant's and the cow's malady."

But to return to the more immediate object of this propoſition.

From the ſimilarity of ſymptoms, both conſtitutional and local, between the Cow Pox and the diſeaſe received from morbid matter generated by a horſe, the common people in this neighbourhood when infected with this diſeaſe, through a

ſtrange

ſtrange perverſion of terms, frequently call it the Cow Pox. Let us ſuppoſe then ſuch a malady to appear among ſome of the ſervants at a farm, and at the ſame time that the Cow Pox were to break out among the cattle; and let us ſuppoſe too that ſome of the ſervants were infected in this way, and that others received the infection from the cows. It would be recorded at the farm, and among the ſervants themſelves wherever they might afterwards be diſperſed, that they had all had the Cow Pox. But it is clear that an individual thus infected from the horſe, would neither be for a certainty ſecure himſelf, nor would he impart ſecurity to others were they inoculated by virus thus generated. He ſtill would be in danger of taking the Small Pox. Yet were this to happen before the nature of the Cow Pox be more maturely conſidered by the public, my evidence on the ſubject might be depreciated unjuſtly. For an exemplification of what is here advanced relative to the nature of the infection when received directly from the horſe, ſee Inquiry into the Cauſes and Effects of the Variolæ Vaccinæ, pages 27, 28, 29, 30, and page 35; and by way of further example, I beg leave to ſubjoin the following intelligence received from Mr. Fewſter, Surgeon, of Thornbury, in this county, a gentleman perfectly

well acquainted with the appearances of the Cow Pox on the human ſubject.

"WILLIAM MORRIS, aged thirty-two, ſervant to Mr. Cox of Almondſbury, in this county, applied to me the 2d of April, 1798. He told me, that four days before he found a ſtiffneſs and ſwelling in both his hands, which were ſo painful, it was with difficulty he continued his work; that he had been ſeized with pain in his head, ſmall of the back and limbs, and with frequent chilly fits ſucceeded by fever. On examination I found him ſtill affected with theſe ſymptoms, and that there was a great proſtration of ſtrength. Many parts of his hands on the inſide were chapped, and on the middle joint of the thumb of the right hand there was a ſmall phagedenic ulcer, about the ſize of a large pea, diſcharging an ichorous fluid. On the middle finger of the ſame hand there was another ulcer of a ſimilar kind. Theſe ſores were of a *circular* form, and he deſcribed their firſt appearance as being ſomewhat like bliſters ariſing from a burn. He complained of exceſſive pain, which extended up his arm into the axilla. Theſe ſymptoms and appearances of the ſores were ſo exactly like the Cow Pox, that I pronounced he had taken the diſtemper from milking cows.

He

He aſſured me he had not milked a cow for more than half a year, and that his maſter's cows had nothing the matter with them. I then aſked him if his maſter had a *greaſy* horſe? which he anſwered in the affirmative, and further ſaid, that he had conſtantly dreſſed him twice a day for the laſt three weeks or more, and remarked that the ſmell of his hands was much like that of the horſe's heels. On the 5th of April I again ſaw him, and found him ſtill complaining of pain in both his hands, nor were his febrile ſymptoms at all relieved. The ulcers had now ſpread to the ſize of a ſeven ſhilling gold coin, and another ulcer, which I had not noticed before, appeared on the firſt joint of the fore-finger of the left hand, equally painful with that on the right. I ordered him to bathe his hands in warm bran and water, applied eſcharotics to the ulcers, and wrapped his hands up in a ſoft cataplaſm. The next day he was much relieved, and in ſomething more than a fortnight got well. He loſt his nails from the thumb and fingers that were ulcerated."

The ſudden diſappearance of the ſymptoms in this caſe after the application of the eſcharotics to the ſores is worthy of obſervation; it ſeems to ſhew that they were kept up by the irritation of the ulcers.

The general ſymptoms which I have already deſcribed of the Cow Pox, when communicated in a caſual way to any great extent, will, I am convinced, from the many Caſes I have ſeen, be found accurate; but from the very ſlight indiſpoſition which enſues in caſes of inoculation, where the puſtule after affecting the conſtitution, quickly runs into a ſcab ſpontaneouſly, or is artificially ſuppreſſed by ſome proper application, I am induced to believe that the violence of the ſymptoms may be aſcribed to the inflammation and irritation of the ulcers (when ulceration takes place to any extent, as in the caſual Cow Pox), and that the conſtitutional ſymptoms which appear during the preſence of the ſore while it aſſumes the character of a puſtule only, are felt but in a very trifling degree. This mild affection of the ſyſtem happens when the diſeaſe makes but a ſlight local impreſſion on thoſe who have been accidentally infected by cows; and, as far as I have ſeen, it has uniformly happened among thoſe who have been inoculated, when a puſtule only and no great degree of inflammation or any ulceration has taken place from the inoculation. The following Caſes will ſtrengthen this opinion.

The Cow Pox appeared at a farm in the village of Stonehouſe, in this county, about Michaelmas laſt, and continued gradually

to

to paſs from one cow to another till the end of November. On the 26th of that month ſome ichorous matter was taken from a cow and dried upon a quill. On the 2d of December ſome of it was inſerted into a ſcratch, made ſo ſuperficial that no blood appeared, on the arm of Suſan Phipps, a child ſeven years old. The common inflammatory appearances took place in conſequence, and advanced till the fifth day, when they had ſo much ſubſided, that I did not conceive any thing further would enſue.

6th. Appearances ſtationary.

7th. The inflammation began to advance.

8th. A veſication perceptible on the edges, forming, as in the inoculated Small Pox, an appearance not unlike a grain of wheat, with the cleft or indention in the centre.

9th. Pain in the axilla.

10th. A little head-ache; pulſe 110; tongue not diſcoloured; countenance in health.

11th.—12th. No perceptible illneſs; pulſe about 100.

13th. The puſtule was now ſurrounded by an effloreſcence, interſperſed with very minute confluent puſtules to the extent of about an inch. Some of theſe puſtules advanced in ſize and

maturated.

maturated. So exact was the reſemblance of the arm at this ſtage to the general appearance of the inoculated Small Pox, that Mr. D. a neighbouring Surgeon, who took ſome matter from it, and who had never ſeen the Cow Pox before, declared he could not perceive any difference*. The child's arm now ſhewed a diſpoſition to ſcab, and remained nearly ſtationary for two or three days, when it began to run into an ulcerous ſtate; and *then* commenced a febrile indiſpoſition accompanied with an increaſe of axillary tumor. The ulcer continued ſpreading near a week, during which time the child continued ill, when it increaſed to a ſize nearly as large as a ſhilling. It began now to diſcharge pus; granulations ſprang up, and it healed. This child had before been of a remarkably ſickly conſtitution, but is now in very high health.

* That the Cow Pox was a ſuppoſed guardian of the conſtitution from the action of the Small Pox, has been a prevalent idea for a long time paſt; but the ſimilarity in the conſtitutional effects between one diſeaſe and the other could never have been ſo accurately obſerved, had not the inoculation of the Cow Pox placed it in a new and ſtronger point of view. This practice too has ſhewn us what before lay concealed, the riſe and progreſs of the puſtule formed by the inſertion of the virus, which places in a moſt conſpicuous light its ſtriking reſemblance to the puſtule formed from the inoculated Small Pox.

MARY

MARY HEARN, twelve years of age, was inoculated with matter taken from the arm of Suſan Phipps.

6th day. A puſtule beginning to appear, ſlight pain in the axilla.

7th. A diſtinct veſicle formed.

8th. The veſicle increaſing; edges very red; no deviation in its appearance at this time from the inoculated Small Pox.

9th. No indiſpoſition: puſtule advancing.

10th. The patient felt this evening a ſlight febrile attack.

11th. Free from indiſpoſition.

12th.—13th. The ſame.

14th. An effloreſcence of a faint red colour extending ſeveral inches round the arm. The puſtule beginning to ſhew a diſpoſition to ſpread, was dreſſed with an ointment compoſed of *hydrarg. nit. rub. & ung. ceræ.* The effloreſcence itſelf was covered with a plaſter of *ung. hydr. fort.*—In ſix hours it was examined, when it was found that the effloreſcence had totally diſappeared. The application of the ointment with the *hydr. nit. rub.* was made uſe of for three days, when the ſtate of the puſtule remaining ſtationary, it was exchanged for the *ung. hydr. nit.* This appeared to have a more active effect than the former, and in two or three days the virus ſeemed to be ſubdued,

when a ſimple dreſſing was made uſe of; but the ſore again ſhewing a diſpoſition to inflame, the *ung. hydr. nit.* was again applied, and ſoon anſwered the intended purpoſe effectually. The girl after the tenth day, when, as has been obſerved, ſhe became a little ill, ſhewed not the leaſt ſymptom of indiſpoſition. She was afterwards expoſed to the action of variolous matter, and completely reſiſted it. Suſan Phipps alſo went through a ſimilar trial. Conceiving theſe Caſes to be important, I have given them in detail; firſt, to urge the precaution of uſing ſuch means as may ſtop the progreſs of the puſtule; and ſecondly, to point out (what appears to be the fact) that the moſt material indiſpoſition, or at leaſt that which is felt moſt ſenſibly, *does not ariſe primarily from the firſt action of the virus on the conſtitution, but that it often comes on, if the puſtule is left to chance, as a ſecondary diſeaſe.* This leads me to conjecture, what experiment muſt finally determine, that they who have had the Small Pox are not afterwards ſuſceptible of the primary action of the Cow Pox virus; for ſeeing that the ſimple virus itſelf when it has not paſſed beyond the boundary of a veſicle, excites in the ſyſtem ſo little commotion, is it not probable the trifling illneſs thus induced may be loſt in that which ſo quickly, and oftentimes ſo ſeverely, follows in the caſual Cow Pox from the

preſence

preſence of corroding ulcers? This conſideration induces me to ſuppoſe that I may have been miſtaken in my former obſervation on this ſubject.

In this reſpect, as well as many others, a parallel may be drawn between this diſeaſe and the Small Pox. In the latter, the patient firſt feels the effect of what is called the abſorption of the virus. The ſymptoms then often nearly retire, when a freſh attack commences different from the firſt, and the illneſs keeps pace with the progreſs of the puſtules through their different ſtages of maturation, ulceration, &c.

Although the application I have mentioned in the caſe of Mary Hearn proved ſufficient to check the progreſs of ulceration and prevent any ſecondary ſymptoms, yet, after the puſtule has duly exerted its influence, I ſhould prefer the deſtroying it quickly and effectually to any other mode. The term cauſtic to a tender ear (and I conceive none will feel more intereſted in this Inquiry than the anxious guardians of a nurſery) may ſound harſh and unpleaſing, but every ſolicitude that may ariſe on this account will no longer exiſt, when it is underſtood that the

puſtule in a ſtate fit to be acted upon is then quite ſuperficial, and that it does not occupy the ſpace of a ſilver penny *.

As a proof of the efficacy of this practice, even before the virus has fully exerted itſelf on the ſyſtem, I ſhall lay before my reader the following hiſtory.

By a reference to the Treatiſe on the Variolæ Vaccinæ it will be ſeen, that in the month of April 1798, four children were inoculated with the matter of Cow Pox, and that in two of theſe caſes the virus on the arm was deſtroyed ſoon after it had produced a perceptible ſickening. Mary James, aged ſeven years, one of the children alluded to, was inoculated in the month of December following with freſh variolous matter, and at the ſame time was expoſed to the effluvia of a patient affected with the Small Pox. The appearance and progreſs of the infected arm was, in every reſpect, ſimilar to that which we

* I mention eſcharotics for ſtopping the progreſs of the puſtule, becauſe I am acquainted with their efficacy; probably more ſimple means might anſwer the purpoſe quite as well, ſuch as might be found among the mineral and vegetable aſtringents.

generally

generally obſerve when variolous matter has been inſerted into the ſkin of a perſon who has not previouſly undergone either the Cow Pox or the Small Pox. On the eighth day conceiving there was infection in it, ſhe was removed from her reſidence among thoſe who had not had the Small Pox. I was now anxiouſly waiting the reſult, conceiving from the ſtate of the girl's arm ſhe would fall ſick about this time. On viſiting her on the evening of the following day (the ninth) all I could learn from the woman who attended her was, that ſhe felt ſomewhat hotter than uſual during the night, but was not reſtleſs; and that in the morning there was the faint appearance of a raſh about her wriſts. This went off in a few hours, and was not at all perceptible to me on my viſit in the evening. Not a ſingle eruption appeared, the ſkin having been repeatedly and carefully examined. The inoculated arm continued to make the uſual progreſs to the end, through all the ſtages of inflammation, maturation, and ſcabbing.

On the eighth day, matter was taken from the arm of this girl (Mary James) and inſerted into the arms of her mother and brother (neither of whom had had either the Small Pox or the Cow Pox) the former about fifty years of age, the latter ſix.

On the eighth day after the inſertion, the boy felt indiſpoſed, and continued unwell two days, when a meaſles-like raſh appeared on his hands and wriſts, and was thinly ſcattered over his arms. The day following his body was marbled over with an appearance ſomewhat ſimilar, but he did not complain, nor did he appear indiſpoſed. A few puſtules now appeared, the greater part of which went away without maturating.

On the ninth day the mother began to complain. She was a little chilly and had a head-ache for two days, but *no puſtule appeared on the ſkin*, nor had ſhe any appearance of a raſh.

The family was attended by an elderly woman as a nurſe, who in her infancy had been expoſed to the contagion of the Small Pox, but had reſiſted it. This woman was now infected, but had the diſeaſe in the ſlighteſt manner, a very few eruptions appearing, two or three of which only maturated.

From a ſolitary inſtance like that adduced of Mary James, whoſe conſtitution appears to have reſiſted the action of the variolous virus, after the influence of the Cow Pox virus had been ſo ſoon arreſted in its progreſs, no poſitive concluſion can

be

be fairly drawn; nor from the hiſtory of the three other patients who were ſubſequently infected, but nevertheleſs, the facts collectively may be deemed intereſting.

That one mild variety of the Small Pox has appeared, I have already plainly ſhewn*; and by the means now mentioned we probably may have it in our power to produce at will another.

At the time when the puſtule was deſtroyed in the arm of Mary James, I was informed ſhe had been indiſpoſed about twelve hours; but I am now aſſured by thoſe who were with her, that the ſpace of time was much leſs. Be that as it may, in caſes of Cow Pox inoculation, I would not recommend any application to ſubdue the action of the puſtule until convincing proofs had appeared of the patient's having felt its effects at leaſt twelve hours. No harm indeed could enſue were a longer period to elapſe before the application was made uſe of. In ſhort, it ſhould be ſuffered to have as full an effect as it could, conſiſtently with the ſtate of the arm.

* See Inquiry into the Cauſes and Effects of the Variolæ Vaccinæ, page 54.

As

As the caſes of inoculation multiply, I am more and more convinced of the extreme mildneſs of the ſymptoms ariſing merely from the primary action of the virus on the conſtitution, and that thoſe ſymptoms which (as in the accidental Cow Pox) affect the patient with ſeverity, are entirely ſecondary, excited by the irritating proceſſes of inflammation and ulceration; and it appears to me that this ſingular virus poſſeſſes an irritating quality of a peculiar kind, but as a ſingle Cow Pox puſtule is all that is neceſſary to render the variolous virus ineffectual, and as we poſſeſs the means of allaying the irritation, ſhould any ariſe, it becomes of little or no conſequence.

It appears then (as far as an inference can be drawn from the preſent progreſs of Cow Pox inoculation) that it is an accidental circumſtance only, which can render this a violent diſeaſe, and a circumſtance of that nature, which fortunately it is in the power of almoſt every one to avoid. I allude to the communication of the diſeaſe from cows. In this caſe ſhould the hands of the milker be affected with little accidental ſores to any extent, every ſore would become the nidus of infection, and feel the influence of the virus; and the degree of violence in the conſti-

tutional

tutional ſymptoms would be in proportion to the number and to the ſtate of theſe local affections. Hence it follows that a perſon, either by accident or deſign, might be ſo filled with theſe wounds from contact with the virus, that the conſtitution might ſink under the preſſure.

Seeing that we poſſeſs the means of rendering the action of the ſores mild, which, when left to chance, are capable of producing violent effects; and ſeeing too that theſe ſores bear a reſemblance to the Small Pox, eſpecially the confluent, ſhould it not encourage the hope that ſome topical application might be uſed with advantage to counteract the fatal tendency of that diſeaſe, when it appears in this terrific form? At what ſtage or ſtages of the diſeaſe this may be done with the moſt promiſing expectation of ſucceſs, I will not pretend now to determine. I only throw out this idea as the baſis of further reaſoning and experiment.

I have often been foiled in my endeavours to communicate the Cow Pox by inoculation. An inflammation will ſometimes ſucceed the ſcratch or puncture, and in a few days diſappear without producing any further effect. Sometimes it will even

produce

produce an ichorous fluid, and yet the ſyſtem will not be affected. The ſame thing we know happens with the Small Pox virus.

Four or five ſervants were inoculated at a farm contiguous to this place, laſt ſummer, with matter juſt taken from an infected cow. A little inflammation appeared on all their arms, but died away without producing a puſtule; yet all theſe ſervants caught the diſeaſe within a month afterwards from milking the infected cows, and ſome of them had it ſeverely. At preſent, no other mode than that commonly practiced for inoculating the Small Pox has been uſed for giving the Cow Pox; but it is probable this might be varied with advantage. We ſhould imitate the caſual communication more clearly were we firſt, by making the ſmalleſt ſuperficial inciſion or puncture on the ſkin, to produce a little ſcab, and then, removing it, to touch the abraded part with the virus. A ſmall portion of a thread imbrued in the virus (as in the old method of inoculating the Small Pox) and laid upon the ſlightly inciſed ſkin, might probably prove a ſucceſsful way of giving the diſeaſe; or the cutis might be expoſed in a minute point by an atom of bliſtering plaſter, and the virus brought in contact with it. In the Caſes

juſt alluded to, where I did not ſucceed in giving the diſeaſe conſtitutionally, the experiment was made with matter taken in a purulent ſtate from a puſtule on the nipple of a cow.

Is *pure pus*, though contained in a Small Pox puſtule, ever capable of producing the Small Pox perfectly? I ſuſpect it is not.—Let us conſider that it is always preceded by the limpid fluid, which, in conſtitutions ſuſceptible of variolous contagion, is always infectious; and though on opening a puſtule its contents may appear perfectly purulent, yet a given quantity of the limpid fluid may at the ſame time be blended with it, though it would be imperceptible to the only teſt of our ſenſes, the eye. The preſence then of this fluid, or its mechanical diffuſion through pus, may at all times render active, what is apparently *mere pus*, while its total abſence (as in ſtale puſtules) may be attended with the imperfect effects we have ſeen.

It would be digreſſing too widely to go far into the doctrine of ſecretion, but as it will not be quite extraneous, I ſhall juſt obſerve, that I conſider both the pus and the limpid fluid of the puſtule as ſecretions, but that the organs eſtabliſhed by nature to perform the office of ſecreting theſe fluids may differ

eſſentially in their mechanical ſtructure. What but a difference in the organization of glandular bodies, conſtitutes the difference in the qualities of the fluids ſecreted? From ſome peculiar derangement in the ſtructure, or, in other words, ſome deviation in the natural action of a gland deſtined to ſecrete a mild, innoxious fluid, a poiſon of the moſt deadly nature may be created: for example — That gland, which in its ſound ſtate ſecretes pure ſaliva, may, from being thrown into diſeaſed action, produce a poiſon of the moſt deſtructive quality. Nature appears to have no more difficulty in forming minute glands among the vaſcular parts of the body, than ſhe has in forming blood veſſels, and millions of theſe can be called into exiſtence, when inflammation is excited, in a few hours *.

In the preſent early ſtage of the Inquiry (for early it certainly muſt be deemed) before we know for an abſolute certainty how ſoon the virus of the Cow Pox may ſuffer a change in its ſpecific properties, after it has quitted the limpid ſtate it poſſeſſes when forming a puſtule, it would be prudent for thoſe who

* Mr. Home, in his excellent diſſertation on pus and mucus, juſtifies this aſſertion.

have

have been inoculated with it to ſubmit to variolous inoculation. No injury or inconvenience can accrue from this; and were the ſame method practiced among thoſe, who, from inoculation have felt the Small Pox in an unſatisfactory manner at any period of their lives, it might appear that I had not been too officious in offering a cautionary hint in recommending a ſecond inoculation with matter in its moſt perfect ſtate.

And here let me ſuppoſe for argument's ſake (not from conviction) that one perſon in an hundred after having had the Cow Pox ſhould be found ſuſceptible of the Small Pox, would this invalidate the utility of the practice? For, waving all other conſiderations, who will deny that the inoculated Small Pox, although abſtractedly it may be conſidered as harmleſs, does not involve in itſelf ſomething that in numberleſs inſtances proves baneful to the human frame.

That in delicate conſtitutions it ſometimes excites ſcrofula, is a fact that muſt generally be ſubſcribed to, as it is ſo obvious to common obſervation. This conſideration is important.

As the effects of the Small Pox innoculation on thoſe who have had the Cow Pox will be watched with the moſt ſcrupulous eye by thoſe who proſecute this Inquiry; it may be proper to bring to their recollection ſome facts relative to the Small Pox, which I muſt conſider here as of conſequence, but which hitherto ſeem not to have made a due impreſſion.

It ſhould be remembered that the conſtitution cannot by previous infection be rendered totally unſuſceptible of the variolous poiſon, neither the caſual nor the inoculated Small Pox, whether it produces the diſeaſe in a mild or in a violent way, can perfectly extinguiſh the ſuſceptibility. The ſkin, we know, is ever ready to exhibit, though often in a very limited degree, the effects of the poiſon when inſerted there; and how frequently do we ſee among nurſes, when much expoſed to the contagion, eruptions, and theſe ſometimes preceded by ſenſible illneſs! yet ſhould any thing like an eruption appear, or the ſmalleſt degree of indiſpoſition, upon the inſertion of the variolous matter on thoſe who have gone through the Cow Pox, my aſſertions reſpecting the peculiarities of the diſeaſe might be unjuſtly diſcredited.

I know

I know a gentleman, who many years ago was inoculated for the Small Pox, but having no puſtules, or ſcarcely any conſtitutional affection that was perceptible, he was diſſatisfied, and has ſince been repeatedly inoculated. A veſicle has always been produced in the arm in conſequence, with axillary ſwelling and a ſlight indiſpoſition: this is by no means a rare occurrence. It is probable that a fluid thus excited upon the ſkin, would always produce the Small Pox.

On the arm of a perſon who had gone through the Cow Pox many years before, I once produced a veſication by the inſertion of variolous matter, and with a little of the fluid, inoculated a young woman who had a mild, but very efficacious Small Pox in conſequence, although no conſtitutional effect was produced on the patient from whom the matter was taken. The following communication from Mr. Fewſter affords a ſtill clearer elucidation of this fact.—Mr. Fewſter ſays, "on the 3d of April 1797, I inoculated Maſter H——, aged fourteen months, for the Small Pox. At the uſual time he ſickened, had a plentiful eruption, particularly on his face, and got well. His nurſemaid, aged twenty-four, had many years before gone through the Small Pox, in the natural way, which was evident

from

from her being much pitted with it. She had uſed the child to ſleep on her left arm, with her left cheek in contact with his face, and during his inoculation he had moſtly ſlept in that manner. About a week after the child got well, ſhe (the nurſe) deſired me to look at her face, which ſhe ſaid was very painful. There was a plentiful eruption on the left cheek, *but not on any other part of the body*, which went on to maturation.

"On enquiry I found that three days before the appearance of the eruption, ſhe was taken with ſlight chilly fits, pain in her head and limbs, and ſome fever. On the appearance of the eruption theſe pains went off, and now (the ſecond day of the eruption) ſhe complains of a little ſore throat. Whether the above ſymptoms are the effects of the Small Pox or a recent cold, I do not know. On the fifth day of the eruption I charged a lancet from two of the puſtules, and on the next day I inoculated two children, one two years, the other four months old, with the matter. At the ſame time I inoculated the mother and eldeſt ſiſter with variolous matter taken from Maſter H——. On the fifth day of their inoculation *all* their arms were inflamed alike; and on the eighth day, the eldeſt of thoſe inoculated

culated from the nurſe ſickened, and the youngeſt on the eleventh. They had both a plentiful eruption, from which I inoculated ſeveral others, who had the diſeaſe very favourably. The mother and the other child ſickened about the ſame time, and likewiſe had a plentiful eruption.

" Soon after a man in the village ſickened with the Small Pox and had a confluent kind. To be convinced that the children had had the diſeaſe effectually, I took them to his houſe and inoculated them in both arms with matter taken from him, but without effect."

Theſe are not brought forward as uncommon occurrences, but as exemplifications of the human ſyſtem's ſuſceptibility of the variolous contagion, although it has been previouſly ſenſible of its action.

Happy is it for mankind that the appearance of the Small Pox a ſecond time on the ſame perſon beyond a trivial extent, is ſo extremely rare, that it is looked upon as a phœnomenon. Indeed, ſince the publication of Dr. Heberden's paper on the *Varicellæ* or Chicken Pox, the idea of ſuch an occurrence, in

deference

deference to authority ſo truly reſpectable, has been generally relinquiſhed. This I conceive has been without juſt reaſon; for after we have ſeen, among many others, ſo ſtrong a Caſe as that recorded by Mr. Edward Withers, Surgeon, of Newbury, Berks, in the Fourth Volume of the Memoirs of the Medical Society of London (from which I take the following Extracts) no one I think will again doubt the fact.

"Mr. RICHARD LANGFORD, a farmer of Weſt Shefford, in this county (Berks) about fifty years of age, when about a month old had the Small Pox at a time when three others of the family had the ſame diſeaſe, one of whom, a ſervant man, died of it. Mr. Langford's countenance was ſtrongly indicative of the malignity of the diſtemper, his face being ſo remarkably pitted and ſeamed as to attrack the notice of all who ſaw him, ſo that no one could entertain a doubt of his having had that diſeaſe in a moſt inveterate manner." Mr. Withers proceeds to ſtate that Mr. Langford was ſeized a ſecond time, had a bad confluent Small Pox, and died on the twenty-firſt day from the ſeizure: and that four of the family, as alſo a ſiſter of the patients, to whom the diſeaſe was conveyed by her ſon's viſiting his uncle, falling down with the Small Pox, fully ſatisfied the

country

country with regard to the nature of the diſeaſe, which nothing ſhort of this would have done: the ſiſter died.

" This caſe was thought ſo extraordinary a one, as to induce the rector of the pariſh to record the particulars in the pariſh regiſter."

It is ſingular that in moſt caſes of this kind, the diſeaſe in the firſt inſtance has been confluent; ſo that the extent of the ulceration on the ſkin (as in the Cow Pox) is not the proceſs in nature which affords ſecurity to the conſtitution.

As the ſubject of the Small Pox is ſo interwoven with that which is the more immediate object of my preſent concern, it muſt plead my excuſe for ſo often introducing it. At preſent it muſt be conſidered as a diſtemper not well underſtood. The Inquiry I have inſtituted into the nature of the Cow Pox, will probably promote its more perfect inveſtigation.

The Inquiry of Dr. Pearſon into the Hiſtory of the Cow Pox having produced ſo great a number of atteſtations in favour of my aſſertion that it proves a protection to the human body from the

Small Pox, I have not been aſſiduous in ſeeking for more; but as ſome of my friends have been ſo good as to communicate the following, I ſhall conclude theſe obſervations with their inſertion.

Extract of a letter from Mr. Darke, Surgeon, at Stroud, in this county, and late Surgeon to the North Gloceſter Regiment of Militia.

"In the ſpring of the year 1796, I inoculated men, women, and children, to the amount of about ſeventy. Many of the men did not receive the infection, although inoculated at leaſt three times and kept in the ſame room with thoſe who actually underwent the diſeaſe during the whole time occupied by them in paſſing through it. Being anxious they ſhould in future be ſecure againſt it, I was very particular in my Inquiries to find out whether they ever had previouſly had it, or at any time been in the neighbourhood of people labouring under it. But after all, the only ſatisfactory information I could obtain was, that they had had the Cow Pox. As I was then ignorant of ſuch a diſeaſe affecting the human ſubject, I flattered myſelf what they imagined to be the Cow Pox was in reality the Small Pox in a very ſlight degree. I mentioned the circumſtance in

the preſence of ſeveral of the officers, at the ſame time expreſſing my doubts if it were not Small Pox, and was not a little ſurpriſed when I was told by the Colonel that he had frequently heard you mention the Cow Pox as a diſeaſe endemial to Gloceſterſhire, and that if a perſon were ever affected by it, you ſuppoſed him afterwards ſecure from the Small Pox. This excited my curioſity, and when I viſited Gloceſterſhire I was very inquiſitive concerning the ſubject, and from the information I have ſince received, both from your publication and from converſation with medical men of the greateſt accuracy in their obſervations, I am fully convinced that what the men ſuppoſed to be the Cow Pox was actually ſo, and I can ſafely affirm that they effectually reſiſted the Small Pox."

Mr. Fry, Surgeon, at Durſley in this county, favours me with the following communication:

"During the ſpring of the year 1797, I inoculated fourteen hundred and ſeventy-five patients, of all ages, from a fortnight old to ſeventy years; amongſt whom there were many who had previouſly gone through the Cow Pox. The exact number I

cannot ſtate; but if I ſay they were near thirty, I am certainly within the number. There was not a ſingle inſtance of the variolous matter producing any conſtitutional effect on theſe people, nor any greater degree of local inflammation than it would have done in the arm of a perſon who had before gone through the Small Pox, notwithſtanding it was invariably inſerted four, five, and ſometimes ſix different times, to ſatisfy the minds of the patients. In the common courſe of inoculation previous to the general one, ſcarcely a year paſſed without my meeting with one or two inſtances of perſons who had gone through the Cow Pox, reſiſting the action of the variolous contagion. I may fairly ſay, that the number of people I have ſeen inoculated with the Small Pox, who at former periods had gone through the Cow Pox, are not leſs than forty; and in no one inſtance have I known a patient receive the Small Pox, notwithſtanding they invariably continued to aſſociate with other inoculated patients during the progreſs of the diſeaſe, and many of them purpoſely expoſed themſelves to the contagion of the natural Small Pox; whence I am fully convinced, that a perſon who had *fairly* had the Cow Pox, is no longer capable of being acted upon by the variolous matter.

" I alſo

"I alſo inoculated a very conſiderable number of thoſe who had had a diſeaſe which ran through the neighbourhood a few years ago, and was called by the common people the *Swine Pox*, not one of whom received the Small Pox *.

"There were about half a dozen inſtances of people who never had either the Cow or Swine Pox, yet did not receive the Small Pox, the ſyſtem not being in the leaſt deranged, or the arms inflamed, although they were repeatedly inoculated, and aſſociated with others who were labouring under the diſeaſe; one of them was the ſon of a farrier."

Mr. Tierny, Aſſiſtant Surgeon of the South Gloceſter Regiment of Militia, has obliged me with the following information:

"That in the ſummer of the year 1798, he inoculated a great number of the men belonging to the Regiment, and that among them he found eleven, who, from having lived in dairies, had

* This was that mild variety of the Small Pox which I have noticed in the late Treatiſe on the Cow Pox, page 54.

gone

gone through the Cow Pox. That all of them reſiſted the Small Pox, except one, but that on making the moſt rigid and ſcrupulous enquiry at the farm in Gloceſterſhire, where the man ſaid he lived when he had the diſeaſe, and among thoſe with whom at the ſame time he declared he had aſſociated, and particularly of a perſon in the pariſh, whom he ſaid had dreſſed his fingers, it moſt clearly appeared that he aimed at an impoſition, and that he never had been affected with the Cow Pox*. Mr. Tierny remarks, that the arms of many who were inoculated after having had the Cow Pox inflamed very quickly, and that in ſeveral a little ichorous fluid was formed."

Mr. Cline, who in July laſt was ſo obliging at my requeſt as to try the efficacy of the Cow Pox virus, was kind enough to give me a letter on the reſult of it, from which the following is an extract.

"My dear Sir,

"The Cow Pox experiment has ſucceeded admirably. The child ſickened on the ſeventh day, and the fever, which was

* The public cannot be too much upon their guard reſpecting perſons of this deſcription.

moderate,

moderate, ſubſided on the eleventh. The inflammation ariſing from the inſertion of the virus extended to about four inches in diameter, and then gradually ſubſided, without having been attended with pain or other inconvenience. There were no eruptions.

" I have ſince inoculated him with Small Pox matter in three places, which were ſlightly inflamed on the third day, and then ſubſided.

" Dr. Liſter, who was formerly Phyſician to the Small Pox Hoſpital, attended the child with me, and he is convinced that it is not poſſible to give him the Small Pox. I think the ſubſtituting the Cow Pox poiſon for the Small Pox, promiſes to be one of the greateſt improvements that has ever been made in medicine; and the more I think on the ſubject, the more I am impreſſed with its importance.

" With great eſteem

" I am, &c.

" HENRY CLINE."

Lincoln's Inn Fields,
Auguſt 2, 1798.

From

From communications, with which I have been favoured from Dr. Pearſon, who has occaſionally reported to me the reſult of his private practice with the vaccine virus in London, and from Dr. Woodville, who has alſo favoured me with an account of his more extenſive inoculation with the ſame virus at the Small Pox Hoſpital, it appears that many of their patients have been affected with eruptions, and that theſe eruptions have maturated in a manner very ſimilar to the variolous. The matter they made uſe of, was taken in the firſt inſtance from a cow belonging to one of the great milk farms in London. Having never ſeen maturated puſtules produced either in my own practice among thoſe who were caſually infected by Cows, or thoſe to whom the diſeaſe had been communicated by inoculation, I was deſirous of ſeeing the effect of the matter generated in London, on ſubjects living in the country. A thread imbrued in ſome of this matter was ſent to me, and with it two children were inoculated, whoſe Caſes I ſhall tranſcribe from my notes.

STEPHEN JENNER, three years and a half old.

3d. Day. The arm ſhewed a proper and deciſive inflammation.

6th. A veſicle

6th. A veſicle ariſing.

7th. The puſtule of a cherry colour.

8th. Increaſing in elevation.—A few ſpots now appear on each arm near the inſertion of the inferior tendons of the biceps muſcles. They are very ſmall, and of a vivid red colour. The pulſe natural; tongue of its natural hue; no loſs of appetite, or any ſymptom of indiſpoſition.

9th. The inoculated puſtule on the arm this evening began to inflame, and gave the child uneaſineſs: he cried, and pointed to the ſeat of it, and was immediately afterwards affected with febrile ſymptoms. At the expiration of two hours after the ſeizure, a plaſter of *ung. hydrarg. fort.* was applied, and its effect was very quickly perceptible; for in ten minutes he reſumed his uſual looks and playfulneſs. On examining the arm about three hours after the application of the plaſter, its effects in ſubduing the inflammation were very manifeſt.

10th. The ſpots on the arms have diſappeared, but there are three viſible in the face.

11th. Two ſpots on the face are gone; the other barely perceptible.

13th. The puſtule delineated in the 2d Plate in the Treatiſe on the Variolæ Vaccinæ, is a correct repreſentation of that on the child's arm, as it appears at this time.

14th. Two

14th. Two freſh ſpots appear on the face. The puſtule on the arm nearly converted into a ſcab. As long as any fluid remained in it, it was limpid.

JAMES HILL, four years old, was inoculated on the ſame day, and with part of the ſame matter which infected Stephen Jenner. It did not appear to have taken effect till the fifth day.

7th. A perceptible veſicle: this evening the patient became a little chilly; no pain or tumor diſcoverable in the axilla.

8th. Perfectly well.

9th. The ſame.

10th. The veſicle more elevated than I have been accuſtomed to ſee it, and aſſuming more perfectly the variolous character than is common with the Cow Pox at this ſtage.

11th. Surrounded by an inflammatory redneſs, about the ſize of a ſhilling, ſtudded over with minute veſicles. The puſtule contained a limpid fluid till the fourteenth day, after which it was incruſted over in the uſual manner; but this incruſtation or ſcab being accidentally rubbed off, it was ſlow in healing.

Theſe children were afterwards fully expoſed to the Small Pox contagion without effect.

Having

Having been requeſted by my friend Mr. Henry Hicks, of Eaſtington, in this county, to inoculate two of his children, and at the ſame time ſome of his ſervants and the people employed in his manufactory, matter was taken from the arm of this boy for the purpoſe. The numbers inoculated were eighteen. They all took the infection, and either on the fifth or ſixth day a veſicle was perceptible on the punctured part. Some of them began to feel a little unwell on the eighth day, but the greater number on the ninth. Their illneſs, as in the former Caſes deſcribed, was of ſhort duration, and not ſufficient to interrupt, but at very ſhort intervals, the children from their amuſements, or the ſervants and manufacturers from following their ordinary buſineſs.

Three of the children, whoſe employment in the manufactory was in ſome degree laborious, had an inflammation on their arms beyond the common boundary about the eleventh or twelfth day, when the feveriſh ſymptoms, which before were nearly gone off, again returned, accompanied with increaſe of axillary tumour. In theſe Caſes, (clearly perceiving that the ſymptoms were governed by the ſtate of the arms) I applied on the inoculated puſtules, and renewed the application three or four times

within an hour, a pledget of lint, previouſly ſoaked in *aqua lithargyri acetati**, and covered the hot efflorescence ſurrounding them, with cloths dipped in cold water.

The next day I found this ſimple mode of treatment had ſucceeded perfectly. The inflammation was nearly gone off, and with it the ſymptoms which it had produced.

Some of theſe patients have ſince been inoculated with variolous matter, without any effect, beyond a little inflammation on the part where it was inſerted.

Why the arms of thoſe inoculated with the vaccine matter in the country ſhould be more diſpoſed to inflame than thoſe inoculated in London, it may be difficult to determine. From comparing my own Caſes with ſome tranſmitted to me by Dr. Pearſon and Dr. Woodville, this appears to be the fact: and what ſtrikes me as ſtill more extraordinary with reſpect to thoſe inoculated in London, is the appearance of maturating eruptions. In the two inſtances only, which I have mentioned (the one from the inoculated, the other from the

* Goulard's Extract of Saturn.

caſual

caſual Cow Pox) a few red ſpots appeared, which quickly went off without maturating. The Caſe of the Rev. Mr. Moore's ſervant may, indeed, ſeem like a deviation from the common appearances in the country, but the nature of theſe eruptions was not aſcertained beyond their not poſſeſſing the property of communicating the diſeaſe by their effluvia. Perhaps the difference we perceive may be owing to ſome variety in the mode of action of the virus upon the ſkin of thoſe who breathe the air of London, and thoſe who live in the country. That the eryſipelas aſſumes a different form in London from what we ſee it put on in the country, is a fact very generally acknowledged. In calling the inflammation, that is excited by the Cow Pox virus, eryſipelatous, perhaps I may not be critically exact, but it certainly approaches near to it. Now, as the diſeaſed action going forward in the part infected with the virus may undergo different modifications, according to the peculiarities of the conſtitution on which it is to produce its effect, may it not account for the variation which has been obſerved?

To this it may probably be objected, that ſome of the patients inoculated, and who had puſtules in conſequence, were newly come from the country; but I conceive that the changes

wrought

wrought in the human body through the medium of the lungs, may be extremely rapid. Yet, after all, further experiments made in London with vaccine virus generated in the country, muſt finally throw a light on what now certainly appears obſcure and myſterious.

The principal variation perceptible to me in the action of the vaccine virus generated in London from that produced in the country, was its proving more certainly infectious and giving a leſs diſpoſition in the arm to inflame. There appears alſo a greater elevation of the puſtule above the ſurrounding ſkin. In my former caſes, the puſtule produced by the inſertion of the virus was more like one of thoſe which are ſo thickly ſpread over the body in a bad kind of confluent Small Pox. This was more like a puſtule of the diſtinct Small Pox, except that I ſaw no inſtance of pus being formed in it, the matter remaining limpid till the period of ſcabbing.

Wiſhing to ſee the effects of the diſeaſe on an infant newly born, my nephew, Mr. Henry Jenner, at my requeſt, inſerted the vaccine virus into the arm of a child about twenty hours old. His report to me is, that the child went through the diſeaſe without

out apparent illneſs, yet that it was found effectually to reſiſt the action of variolous matter with which it was ſubſequently inoculated.

I have had an opportunity of trying the effects of the Cow Pox matter on a boy, who, the day preceding its inſertion, ſickened with the meaſles. The eruption of the meaſles, attended with cough, a little pain in the cheſt, and the uſual ſymptoms accompanying that diſeaſe, appeared on the third day, and ſpread all over him. The diſeaſe went through its courſe without any deviation from its uſual habits; and, notwithſtanding this, the Cow Pox virus excited its common appearances, both on the arm and on the conſtitution, without any ſenſible interruption; on the ſixth day there was a veſicle.

8th. Pain in the axilla, chilly, and affected with head-ache.

9th. Nearly well.

12th. The puſtule ſpread to the ſize of a large ſplit pea, but without any ſurrounding efflorescence. It ſoon afterwards ſcabbed, and the boy recovered his general health rapidly.

Here we ſee a deviation from the ordinary habits of the Small Pox, as it has been obſerved that the preſence of the meaſles ſuſpends the action of variolous matter.

The very general inveſtigation that is now taking place, chiefly through inoculation (and I again repeat my earneſt hope that it may be conducted with that calmneſs and moderation which ſhould ever accompany a philoſophical reſearch) muſt ſoon place the vaccine diſeaſe in its juſt point of view. The reſult of all my trials with the virus on the human ſubject, has been uniform. In every inſtance, the patient who has felt its influence, has completely loſt the ſuſceptibility for the variolous contagion; and as theſe inſtances are now become numerous, I conceive that, joined to the Obſervations in the former part of this paper, they ſufficiently preclude me from the neceſſity of entering into controverſies with thoſe who have circulated reports adverſe to my aſſertions, on no other evidence than what has been caſually collected.

FINIS.